FMS-11 FORMS MANAGEMENT SYSTEM

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FMS-11 is a set of software tools that provides a screen management front-end to applications using the VT100 terminal under Digital's RT-11, RSX-11M, and RSX-11M-PLUS operating systems. FMS-11 forms provide a flexible yet easy-to-use interface between terminal users and the application program. FMS-11 software allows users to develop applications in a variety of standard programming languages. FMS-11 also allows these applications to be packaged for use either on Digital's PDT-11 intelligent terminal systems or with VT100 terminals on PDP-11 systems.

FEATURES

- Use of many of the VT100 video terminal features including reverse video, bold, blink, and underline characters, and split screen and scrolling capabilities
- HELP facility for forms as well as for fields within forms to provide on-the-spot assistance to operators, without complicating the program development effort
- Extensive field protection and validation features to ensure the integrity of data that is returned to the application program
- Ability to design forms directly and interactively on the video screen, eliminating the need to lay out the form on paper, code form language statements, compile, debug, enter corrections, etc.
- Forms are designed and stored independent of the application program. This means that individual field descriptions may be modified without having to reconstruct the form, recompile or relink the application, or reprocess collected data. This feature simplifies minor application modifications and reduces program maintenance requirements. Storage of forms in libraries on disk also reduces program memory requirements.
- Form Driver provides a wide range of terminal I/O functions, including both field and record level I/O calls and flexible manipulation of scrolled regions of the screen.
- Application Run-Time Supervisor allows application programs to run in a multiterminal RT-11 environment, facilitating program development for multiterminal applications systems.
- Applications using FMS-11 can be programmed in COBOL-11, BASIC, FORTRAN or MACRO-11 assembler, depending on the needs of the application.

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DESCRIPTION

FMS-11 is a set of utilities and subroutines that facilitates development of interactive applications for the VT100 video terminal in assembler or high-level languages. A special-purpose interactive editor is used to create FMS-11 form definitions. The Form Utility provides a means for maintaining disk-resident form libraries via creation, extraction, insertion, directory listing, and other such operations. Finally, application programs control the operator's interaction with the form by subroutine calls to FMS-11 Form Driver subroutine library.

FMS-11 Forms

FMS-11 forms include a video screen image comprising data fields and constant background text, along with protection and validation information for individual data fields. The data fields and background text can be highlighted using the VT100 video attributes such as reverse video, underline, blink and bold characters. Split screen and scrolling capabilities permit users to view more data than can be displayed on the screen at one time.

Individual data fields can be display-only, enter-only (no echo), or can be restricted to modification by privileged users. Data fields can be formatted with fill characters, default values, and formatting characters (such as the dash in a phone number), which assist the user, but are not visible to the application program. Fields may be right or left justified or may use a special fixed decimal field type to align data properly.

Field validation includes checking each keystroke in a field for the proper data type (e.g., alphabetic, numeric, etc.). Fields may also be defined as "must enter" or "must complete."

A line of HELP information may be associated with each field, and a chain of HELP screens may be associated with each form. If users need help while using a form, all they need to do is to press the HELP key to see a line of useful information about the current field. Pressing the key a second time will display the first HELP screen associated with the current form. Subsequent depressions will chain through any additional HELP forms chained to the first one until the operator chooses to return to the original application context.

FMS-11 Programs

A number of components are used to create FMS-11 applications. These are the Form Editor, the Form Utility, the Form Driver, and, for RT-11 only, the Application Run-Time Supervisor.

The Form Editor

The Form Editor (FED) is a system program that provides a simple means of entering, modifying, and storing FMS-11 form descriptions. FED is an interactive program that also uses many of the special capabilities of the VT100 video terminal.

When using FED, a user's screen always shows the current state of the form that is being edited. Keypad and keyboard functions allow users to specify video display characteristics for either constant text or field characters. Fields are defined on the screen with COBOL-like picture characters. Short, helpful explanations about individual fields and about each form as a whole may be included as part of the form description.

Fields and forms are accessed by name, rather than by less flexible structures such as row-column coordinates and sizes. Because the relationship between programs and fields is made at execution time, the design of a form can be changed without changing the applications that use the form.

The "named data" feature provides a mechanism for storing constant data (such as file names and range check parameters) in the form description for use by the application program. By using named data, the programmer can write a more general, more maintainable application.

Form Utility

The Form Utility (FUT) is a system program that performs a variety of form library maintenance functions, including creation of new libraries, and the insertion, deletion, replacement, and extraction of individual forms. It also creates hard copy listings of form descriptions, lists the directory of a form library, and produces object modules from form descriptions. These object modules can be linked with the application program to produce forms that are entirely memory resident. In addition, on systems that support COBOL the Form Utility can write out Data Division code that corresponds to a form definition and is suitable for copying into a COBOL source program.

Form Driver

The Form Driver (FDV), a re-entrant system subroutine, uses the forms created with FED. Under the direction of the calling program, FDV displays forms, performs all screen management a form requires, handles all terminal I/O for application programs, and validates user responses by checking each response against the field and form description. Depending on the needs of the application, programs and forms may interact on either a field-by-field or a whole record basis. FDV may be called from applications written in MACRO, BASIC, COBOL, or FORTRAN. Because the Form Driver calls are virtually identical in all languages, proficiency in using FMS-11 is easily transferable across languages and operating systems, and programs themselves become much more portable.

Application Run-Time Supervisor

Available only with FMS-11/RT-11, the Application Run-Time Supervisor (ARTS) is a multitasking submonitor that controls the interface between form applications and the RT-11 operating system. ARTS runs in the background area of the RT-11 foreground/background monitor, along with the individual application programs, which are called tasks. When an application is running, each terminal has its own copy of a task. ARTS includes a demand scheduler that handles resources and processing activities so that each terminal may run its task independently.

ARTS allows multiterminal applications to be written in FORTRAN IV or MACRO-11. In multiterminal applications, concurrent tasks can share public files and resident code libraries. Applications can include global system tasks not attached to any terminal. Terminal tasks can use a system task by sending messages to it and receiving messages from it.

Form applications using ARTS may be either dynamic or static. Dynamic systems allow each terminal to change tasks without affecting the tasks executing at other terminals. Static systems, on the other hand, provide fixed relationships between tasks and terminals, locking each terminal into its own individual task. Static systems are most suitable when users do the same work for long periods of time and when that work can be implemented as a small, fixed number of tasks.

Form application systems are also available that use FDV but do not include any of the special ARTS multitask or multiterminal capabilities. The most common use for such a system is debugging and testing tasks as they are being written.

The FMS-11 system generation procedure uses a clear interactive dialogue to select the ARTS features required for a particular application. The hardware on which the application executes may be predefined at ARTS generation time, or it may be specified when ARTS begins to run.

OPERATING ENVIRONMENT

Form application development requires at least 40K bytes of memory. The development system requires at least two RK05 disk packs or equivalent disk storage to perform an FMS-11 system generation. Run-time system memory requirements are 8K bytes for FDV and from 2K bytes to 12K bytes for ARTS, depending on capabilities specified during system generation. The Form Editor and Form Driver require the use of VT100 video terminals.

The following chart describes the supported operating environments for FMS-11:

	FMS-11/RT-11	FMS-11/RSX
Application Development Environments	RT-11	RSX-11M, RSX-11M-PLUS
Application Execution Environment	RT-11, RT^2,RT^2/PDT	RSX-11M, RSX-11M-PLUS, RSX-11S
Languages Supported	MACRO-11, FORTRAN IV, BASIC-11	MACRO-11, FORTRAN IV-PLUS, FORTRAN IV-PLUS, BASIC-PLUS-2, COBOL-11

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